

# Simplest Shortest Path First for Provisioning Optical Circuits in Dense Mesh Network Configurations

## Abstract

A method for determining the shortest simplest path in a optical network with mixed DWDM transmission characteristics, mixed switching methodologies (i.e. micro mirrors, bubbles, Electronic TDM, Electronic cross bar, optical signal regeneration, and DWDM wavelength translation using optical devices). Disclosed in the invention is: a.) a multi-layered network path determination method that resolves over-constrained routing requirements, b.) an application of A that resolves routing constraints described for the optical networking environment, c.) A Dense Mesh simplification method that radically reduces the computation and processing power to find the best approximate path through the network, d.) A caching strategy to cache approximate paths rather than exact paths and to age out cache entries just before they become incorrect e.) A method of calculating multiple metrics and checking them against routing requirements during the path determination process rather than afterwards as is done usually f.) A method to turn an approximate path into an exact path that enforces simplest shortest path first and keys cache age out, g.) A method of filling cache entries that enforces simplest shortest path first

The "Simplest path" has no signal regenerators, wavelength translators, or use of electronic switching. Slightly simpler paths require a minimum number of signal regenerators, wavelength translators, or electronic switching. In general terms it is a path that can be completed at the lowest level possible first and then progressively falls back to higher and higher levels to complete a path that meets routing requirements. "Simplest Shortest path" indicates that a longer path that is simpler has precedence of a "Shorter path" that has additional resource requirements.

Inventors: Matthews, Wallace E. (Mendon, Mass)

Assignee: Matthews, Wallace E. (Mendon, Mass)

Appl No.:

Filed:

## References Cited

### U.S. Patent Documents

4201889	06-May-1980	Lawrence et. al.
4565903	21-Jan-1982	Riley
4873517	10-Dec-1989	Baratz et. al.
4979118	18-Dec-1990	Kheradpir
4987536	22-Jan-1991	Humblet
4991204	05-Feb-1991	Yamamoto
5218602	08-Jun-1993	Grant